HARRIS

HA-5082 Series

JFET Input Dual Operational Amplifiers

Preliminary

FEATURES

- HIGH INPUT IMPEDANCE $10^{12}\Omega$
- LOW INPUT BIAS CURRENT 200pA
- LOW INPUT OFFSET CURRENT 100pA
- LOW POWER CONSUMPTION TYPICAL SUPPLY CURRENT 3.5mA
- HIGH SLEW RATE 15V/μs
- PIN COMPATIBLE WITH LM1458
- DIRECT REPLACEMENT FOR TL082

APPLICATIONS

- ACTIVE FILTERS
- INSTRUMENTATION AMPLIFIERS
- AUDIO AMPLIFIERS
- SIGNAL CONDITIONING

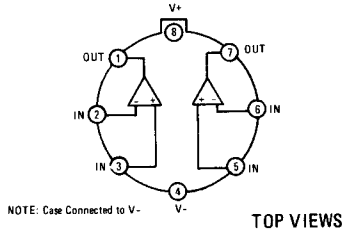
DESCRIPTION

The HARRIS HA-5082 operational amplifiers are a series of dual monolithic JFET-input amplifiers featuring low input bias and offset currents, high input impedance and, high slew rate. In addition to being a direct replacement for the TL082 series, the HA-5082 series offers improved performance with an input offset voltage of 2mV, a slew rate of 15V/μs, and bandwidths of 4MHz.

This improved performance is a result of the HARRIS FET/Bipolar technology and makes the HA-5082 series of amplifiers ideally suited for applications in industrial control, communication, and computer peripheral equipment.

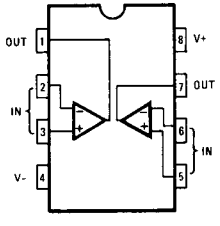
The HA-5082-2 is characterized for operation over the full military temperature range of -55°C to +125°C. The HA-5082A-5, HA-5082B-5 and HA-5082-5 are all characterized over the commercial temperature range of 0°C to +75°C.

PINOUTS

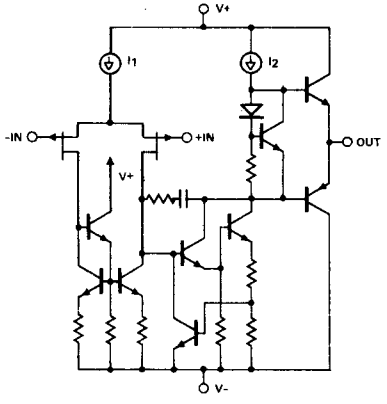


NOTE: Case Connected to V-

TOP VIEWS



SIMPLIFIED SCHEMATIC



(ONE HALF ONLY)

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS (Note 1)

Voltage Between V+ and V- Terminals	±20V	Power Dissipation	600mW*
Differential Input Voltage	±40V	Operating Temperature Range:	
Input Voltage (Note 2)	±15.0V	HA-5082-2	$-55^{o}C \leq T_A \leq +125^{o}C$
Output Short Circuit Duration	Indefinite	HA-5082-5	$0^{o}C \leq T_A \leq +75^{o}C$
		Storage Temperature Range	$-65^{o}C \leq T_A \leq +150^{o}C$

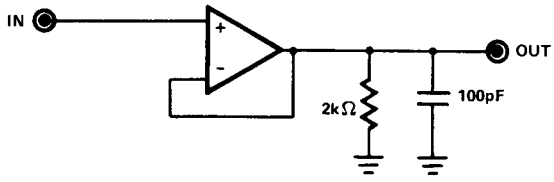
*To-99 Derate by 6.75mW/°C above +85°C
Dip Derate by 5.57mW/°C above +65°C

ELECTRICAL CHARACTERISTICS V+ = 15V, V- = -15V. Parameters are guaranteed at indicated ambient temperature after warm-up.

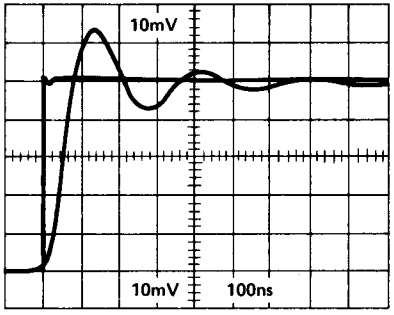
		HA-5082-2 -55°C to +125°C			HA-5082A-5 0°C to 75°C			HA-5082B-5 0°C to 75°C			HA-5082-5 0°C to +75°C			
PARAMETER	TEMP.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	UNITS
INPUT CHARACTERISTICS														
Offset Voltage (Note 3)	+25°C		3	5		3	5			2		5	15	mV
	Full			8			7			4			20	mV
Av. Offset Voltage Drift	Full		10			10			10			10		µV/°C
Bias Current	+25°C		30	200		30	200		30	200		30	400	pA
	Full			50			8			4			10	nA
Offset Current	+25°C		5	100		5	100		5	100		5	200	pA
	Full			20			4			2			5	nA
Common Mode Range	Full	±10	±12		±10	±12		±10	±12		±10	±12		V
Input Resistance	+25°C		10^{12}			10^{12}			10^{12}			10^{12}		MΩ
TRANSFER CHARACTERISTICS														
Large Signal Voltage Gain (Note 4)	+25°C	50K	200K		50K	200K		50K	200K		25K	200K		V/V
	Full	15K			25K			25K			15K			V/V
Common Mode Rejection Ratio (Note 5)	+25°C	80	86		80	86		80	86		70	76		dB
Unity Gain Bandwidth	+25°C		4			4			4			4		MHz
OUTPUT CHARACTERISTICS														
Output Voltage Swing (Note 6)	+25°C	±10	±12		±10	±12		±10	±12		±10	±12		V
	Full	±10			±10			±10			±10			V
Output Current (Note 7)	+25°C	±5			±5			±5			±5			mA
Full Power Bandwidth (Note 8)	+25°C		240			240			240			240		kHz
TRANSIENT RESPONSE														
Rise Time (Note 9)	+25°C		60			60			60			60		nsec
Overshoot (Note 9)	+25°C		10			10			10			10		%
Slew Rate (Note 10)	+25°C		15			15			15			15		V/µs
Settling Time (Note 11)	+25°C		2			2			2			2		µsec
POWER SUPPLY CHARACTERISTICS														
Supply Current (Note 12)	+25°C		3.5	5.6		3.5	5.6		3.5	5.6		3.5	5.6	mA
Power Supply Rejection Ratio (Note 13)	+25°C	80	86		80	86		80	86		70	76		dB

NOTES:
1. Absolute maximum ratings are limiting values, applied individually, beyond which the serviceability of the circuit may be impaired. Functional operability under any of these conditions is not necessarily implied.
2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
3. $R_S = 100\Omega$.
4. $R_L \geq 2K\ \Omega$, $V0 = \pm 10V$.
5. $\Delta V_{IN} = \pm 10V$.
6. $R_L = 2K\Omega$.
7. $V_{OUT} = \pm 10V$
8. $R_L = 2K$; Full power bandwidth guaranteed based on slew rate measurement using $FPBW = \frac{SLEW\ RATE}{2\pi V_{PEAK}}$.
9. $V_{IN} = 50mV$, $C_L = 100pF$, $R_L = 2K\ \Omega$.
10. $V_{IN} = 10V$, $C_L = 100pF$, $R_L = 2K\ \Omega$.
11. Settling time is measured to 0.1% of final value for a 10 volt output step and $A_V = -1$.
12. No load, No signal.
13. $V_{SUPP} = \pm 5V$ D.C. to ±15 V.D.C.

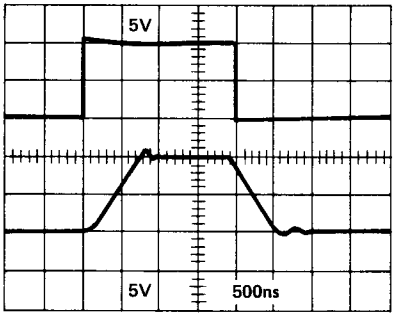
SLEW RATE AND TRANSIENT RESPONSE TEST CIRCUIT



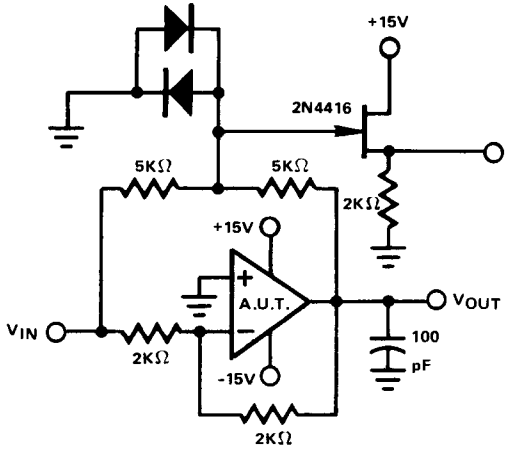
SMALL SIGNAL RESPONSE
Vertical Scale: 10mV/Div.
Horizontal Scale: 100ns/Div.



LARGE SIGNAL RESPONSE
Vertical Scale: 5V/Div.
Horizontal Scale: 500ns/Div.



SETTLING TIME CIRCUIT



- A_V = -1.
- Feedback and summing resistors should be 0.1%.
- Clipping diodes are optional. HP5082-2810 recommended.